



ENHANCEMENT OF CONCEPTUALIZATION OF BIOLOGICAL CONCEPTS BY SUPPORTIVE LEARNING MATERIAL FOR IX STANDARD STUDENTS - A STUDY

Ms. Manisha B. Yadav¹, Prin. Dr. (Smt.) Megha V. Gulavani²

¹ Senior Lecturer, DIECPD, Bhandara, Maharashtra, India

² In-Charge Dean, Faculty of Interdisciplinary Studies, Department of Education, Shivaji University, Kolhapur

ABSTRACT

The study aimed at identifying biological misconceptions held by IX standard students and developing proper supportive learning material for concept enhancement. In order to fulfill this objective, a mixed method research design, specifically the descriptive survey and the experimental research was adopted for the study. This paper is discussed about area of biological misconception. The study has been proceed through development of SLM and assessing its effectiveness by experimentation.

KEYWORDS: Enhancement, Misconception, Identification, Biological, SLM

INTRODUCTION

Underpinning science education reform movements in the last 20 years at all levels and within all disciplines is an explicit shift in the goals of Science teaching from student simply creating a knowledge base of scientific facts to students developing deeper understanding of major concepts within a scientific discipline.

- Tanner and Alleri, 2005

Thus, learning of concepts becomes the main focus of any educational discipline, much though the teaching- learning of concepts is a complex process. For concept enhancement, proper supportive learning material is provided to students to remove science misconceptions. This study provides the relationship between supportive learning material and learning achievements of students.

Objectives of the Study:

The objectives of the study are as follows:

- 1) To select biological concepts from IX standard science and technology textbook.
- 2) To develop supportive learning material for enhancing conceptualization of biological concepts from IX standard science and technology textbook.
- 3) To identify misconceptions with the help of Researcher made tests of misconception.

Assumptions Of The Study

The present study is based on following assumptions.

- 1) In IX standard science and technology textbook, biological concepts are present.
- 2) Cognitive structure is developed in student at the time of learning.
- 3) Different types of supportive learning material is required for enhancement of conceptualisation in science subject.

Research Hypothesis of the study

A) Research Hypothesis :

- 1) Supportive learning material will prove useful to enhance conceptualisation of IX standard students in science subject.

B) Null Hypothesis :

- 1) There is no significant difference between the conceptualization of biological concepts of experimental and control group.
- 2) There is no significant difference between science achievement score of experimental and control group.

LIMITATIONS, DELIMITATIONS AND SCOPE OF THE STUDY

Delimitations of The Study

- 1) The present study is limited to IX standard students from Vita city only.
- 2) The present study is limited to two Marathi medium High School which is from Vita city in Sangli District.
- 3) The present study is limited to certain biological concepts from IX standard science and technology textbook.
- 4) Developed supportive learning material will considered for the present study only.
- 5) The present study is limited to those secondary students admitted in

academic Year 2012-13.

- 6) Research is limited to the contents, which are based on Science & Technology text book published by 'Balbharati' at secondary level.

Limitations of The Study

- 1) The validity of the study is greatly influenced by the accuracy of the responses given by the students concerned.
- 2) The number of subjects in the study depends on the equivalent group selected from the ninth standard of the school.

Scope of The Study

The present study can be extended to all schools of Marathi medium using science and technology textbooks published by Maharashtra State Board of Secondary And Higher Secondary Education, Pune.

RESEARCH METHODOLOGY

Research Method

For Present study, Mixed Research design will be used involving Survey method and an Experimental method. In this Experimental method, Pre-test Post-test equivalence control group design.

Sampling

The target population is the students of IX standard studying in Marathi medium school. So for testing the above mentioned hypothesis, two secondary Marathi Medium Schools from Vita city Viz. Mahatma Gandhi Vidyamandir, Vita and Late KishaBapu Kondopant Gulavani Secondary School, Vita were selected purposively. From that school, IX standard students (80) will be selected on the basis of standardized test of intelligence from each school to make equivalence group 40 students will be treated as control group and other 40 students will be treated as experimental group.

For this research, 10 Science experts having 15 years teaching experience at secondary level will be selected purposively for identifying concepts, its terms and for checking validity of supportive learning material.

Tools for Data Collection:

The following tools were used for the present study.

1) Collection of Test

- i) Standardized test of Intelligence-to make equivalence group of students.

2) Preparation of Tool

- i) Questionnaire for pilot study.
- ii) Check list to identify concepts, its terms for concept mapping.
- iii) Researcher made test of misconception-to identify misconception.
- iv) Validity Scale for supportive learning material development.
- v) Achievement Test of Science.
- vi) Concept map scoring rubric.

Statistical Technique

For the present study, Suitable descriptive statistical techniques such as Mean, S.D., Chi-square test and 't' test was employed to analyze the collected data.

PROCEDURE OF RESEARCH**1st Stage: Preparatory Phase**

- 1) Identification of Standardized Test of Intelligence for making equivalence group of IX standard students.
- 2) Document Analysis of syllabus of IX standard science subject textbook at secondary level concerning concepts and its terms.
- 3) Development of supportive learning material required for enhancement of conceptualization of biological concepts in science subject at IX standard.

2nd Stage: Experimental Phase

- 1) Identification of misconception with the help of standardized test for misconception.
- 2) Provide supportive learning material helpful for enhancement of conceptualisation of biological concepts.
- 3) Evaluation of Concept mapping at every stage.

MAJOR FINDINGS OF THE STUDY

- 1) Supportive learning material (SLM) significantly enhance conceptualization of biological concepts from IX standard science and technology textbook.
- 2) Supportive learning material (SLM) significantly enhance academic achievement in science subject among IX standard pupils.
- 3) There is a significant difference between the experimental and control group for the achievement scores in science and technology when taught using concept mapping strategy included in SLM.

There is a significant difference between the experimental and control group for the achievement scores in science and technology related to biological concepts when taught through SLM.

REFERENCES

1. Anderson, L.W., (1995), The International encyclopedia of teaching and teacher education (2nd Ed.), New York : Pergamon Press
2. Biddle, B.T., Good, T.L., Goodson, I.F., (1997), International Handbook of teachers and teaching, London : Kluwer Academic Publisher
3. Best, J.W., Kahn, J.V. (2009), Research in Education (10th Ed.), New Delhi : PHI Learning Private Limited.
4. Buch, M.B. (Eds.), (1972-78), Second Survey of Research in Education, Baroda : Society for Educational Research and Development.
5. Buch, M.B. (Eds.), (1978-83), Third Survey of Research in Education, New Delhi : N.C.E.R.T.
6. Buch, M.B. (Eds.), (1983-88), Fourth Survey of Research in Education, New Delhi : N.C.E.R.T.
7. Buch, M.B. (Eds.), (1988-92), Fifty Survey of Research in Education, New Delhi : N.C.E.R.T.
8. Cohen, D. (1987), The use of concept maps to represent unique thought processes; Toward more meaningful learning journal of curriculum and supervision.2(3), 285-289
9. Gray, Audery (1997), A Constructivist Teaching and Learning Retrieved, September 26, 2001, from file : 11 on document % 20 and % 20 settings/ abc/Desktop/New%20 fold or <http://so.skschoolboards.co./research/instruction/97-07.htm>.
10. Griffin, C., Malone, L., and Kameenui, E. (1995), Effects of graphic organizer instruction on fifth grade students journal of Educational Research, 89(2), 98-107
11. Gurley, L.I. (1982), Use of Gowin's vee and concept mapping strategies to teach responsibility for learning in high school biological science, Ph.D. Dissertation, Cornell University
12. Hawk, P. (1986), Using graphic organizers to increase achievement in middle school life science. Science Education, 70(1), 81-87
13. Jonassen, D.H., Beissner, K., and Yacci, M. (1993), Structural knowledge. Techniques for representing conveying and acquiring structural knowledge, Hillsdale, NJ : Lawrence Erlbaum Associates.
14. Kinnear, J., Gleeson, D. and Comerford, C. (1985), Use of concept maps in assessing the value of a computer based activity in biology. Research in Science Education, 15, 103-111
15. Kommers, P. (1995), Teaching and Learning with concept mapping Tools and Hypermedia. In E. Orhun, C. Holmes, C. Bowerman and M. Vivet (Eds.) Computer Based tools for Teaching and Learning, Izmir : Ege University Press, 117-128
16. Kopec, D., Wood, C. and Brody, M. (1990/91), Using cognitive mapping techniques for educating about sexually transmitted diseases with an intelligent tutoring system. Journal of Artificial Intelligence in Education, 2 (2), 67-82
17. Novak, J.D. and Gowin, D.B., (1984), Learning How to learn, Cambridge : Cambridge University Press.
18. Pankratius, W.J. (1990), Building an organized knowledge base : Concept mapping and achievement in secondary school physics. Journal of Research in Science Teaching, 27 (4), 315-333
19. Starr, M.L., and Krajcik, J.S. (1990), Concept maps as a heuristic for science curriculum development : Toward improvement in process and product Journal of Research in Science Teaching, 27(10), 987-1000
20. Wandersee, J.H. (1987), Drawing concept circles : A new way to teach and test students, Science Activities, 24(4), 1, 9-20.
21. Willerman, M., and Mac Harg, R.A. (1991), The concept map as an advance organizer. Journal of Research in Science Teaching, 28, 705-711
22. करंदीकर, सुमन व पटवर्धन, अनीता (२०००), ज्ञानाचा रचयिता माझा मीच, पुणे: आपणच
23. पानसे, रमेश (2010), रचनावादी शिक्षण, सतारा
24. पारसनिस, हेमलता (२०१०, मार्च), ज्ञानरचनावाद, शिक्षण, संक्रमण, १५-४६
25. महाराष्ट्र राज्य माध्यमिक व उच्च माध्यमिक शिक्षण मंडळ (२०१०), विज्ञान व तंत्रज्ञान, पुणे: एस. सी. आर. टी.
26. महाराष्ट्र राज्य शैक्षणिक संसोधन व प्रशिक्षण परिषद् (२००८), राष्ट्रीय अभ्यासक्रम आराखडा २००५, पुणे: एस. सी. आर. टी.

27. सप्रे, एन. आर., पाटिल, पी., पाटिल, जे. (२००१), गतिमान शिक्षणासाठी विचारप्रवाह, कोल्हापूर: फडके प्रकाशन
28. सप्रे, एन. आर. (२०१०, नोव्हेंबर), मॅट्रिक्स शिक्षण-एक आव्हान, भारतीय शिक्षण, २२-२६